Assignment 14

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Download the latex-tikz codes from

https://github.com/pavanmanesh/EE5609/tree/master/Assignment14

1 Problem

Let **T** be the linear operator on a $n-$ dimensional vector space **V** and suppose that **T** has an n distinct characteristic values.Prove that **T** is diagonalizable.

2 Results used

Diagonalizable	A linear operator **T** on a finite-dimensional vector space **V** is diagonalizable if and only if there exists an basis of **V**, consisting of eigen vectors of **T**
Eigen vectors	If $\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k$ are eigenvectors of a linear operator **T** with distinct eigen values $\lambda_1, \lambda_2, \ldots, \lambda_k$,then $\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_k$ are linearly independent

3 Solution

Given	**T** has an n distinct characteristic values and dim(**V**) = n
T is diagonalizable	Let $\lambda_1, \lambda_2, \ldots, \lambda_n$ be distinct eigen values of **T** and let $\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n$ be the eigen vectors of **T**..From above results we can state that $\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n\}$ is linearly independent.And also given that dim(**V**) = n .So,this set forms a basis of **V**. $\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n\}$ is a basis for **V** consisting of eigen vectors of **T**. So, **T** is diagonalizable.